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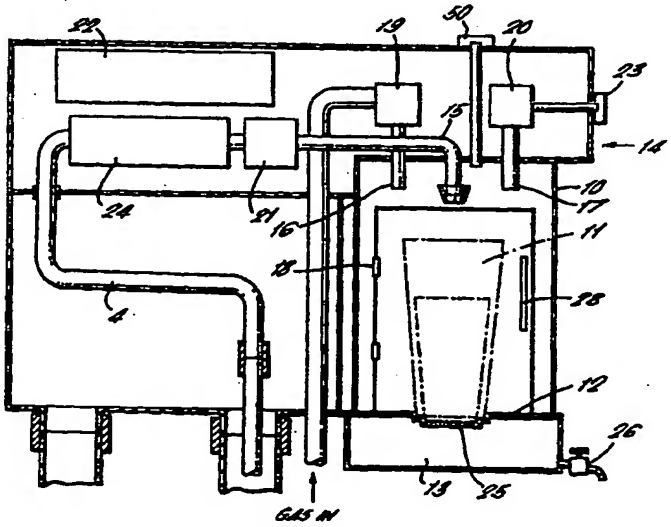


(57) Abstract

Dispensing apparatus for a beverage includes a receptacle having a base and a manifold coupled to the base. The manifold includes beverage inlet means, gas inlet means and gas outlet means. The receptacle includes an aperture for receiving a container, for example, a beer glass, and sealing means are provided on the receptacle so that the receptacle may be pressurised. In another aspect, the invention includes a product flow line for conveying the beverage from a storage point to the dispensing apparatus, the flow line including one or more product lines surrounded by a water flow line containing cooled water for maintaining the temperature of the beverage within the beverage line to within 1/2 °Celsius of a desired temperature.

INTEGRATED DISPENSE SYSTEM

Beers, including ales and lagers, are typically gassed by dissolving a gas such as carbon dioxide, or a mixture of carbon dioxide and an inert gas, in the beer during production. When dispensed the dissolved gas comes out of solution as the beverage is depressurised forming bubbles in the beverage that in turn seed and nucleate other bubbles that rise to the top of the beverage forming a head. Ideally the head should be close-knit and creamy in order to maximise the longevity of the head and its aesthetic appeal and feel on the mouth of the drinker.

The range of carbonation levels of beers is typically 0.8-2.7 volumes. Traditional dispensing methods work well with beers having low or medium carbonation levels of 0.8-1.8 volumes. However high carbonation beers, having a carbonation typically above 2.0 volumes, such as some lagers are difficult to dispense since the carbon dioxide in the beer is significantly above its saturation point for ambient conditions. Therefore when the beer is dispensed the gas is released spontaneously which may result in the beverage over-foaming and spilling over the top of the glass and may also result in so much of the dissolved gas being released that the remaining beverage is left `flat' with atypical taste and appearance.

It is therefore an object of the present invention to provide an integrated dispense system to enable beers with high carbonation levels to be dispensed with a long-lasting creamy head whilst retaining an adequate proportion of the carbonating gas in solution. It is another object of the present invention to provide a

method for dispensing a high carbonation beer to produce long-lasting creamy heads which produce `lacing' of the head down the sides of the glass as the beverage is consumed, which has been found to be desired by customers.

The present invention therefore comprises a dispensing apparatus for a beverage comprising a receptacle; said receptacle comprising a base and a manifold coupled thereto; said manifold including beverage inlet means, gas inlet means and gas outlet means; said receptacle further comprising aperture means for receiving therethrough in use a container; sealing means being provided on said receptacle for rendering the receptacle pressurisable.

An advantage of the present invention is that the dispensation of high carbonation beers, particularly those beers having a carbonation level in excess of 2.0 volumes, is enabled to produce a beverage having an attractive and long-lasting creamy head and an adequate proportion of the carbonating gas being retained in solution.

In a first embodiment the aperture means comprises a door in said receptacle.

In a second embodiment the receptacle comprises engagable segments, hinged to open along a long axis of the receptacle; said aperture means comprising an opening between the engagable segments so formed.

In a third embodiment the manifold is removable from the receptacle; said aperture means comprising an opening between the receptacle and the manifold so

formed.

Alternatively the base is removable from the receptacle; said aperture means comprising an opening between the receptacle and the base so formed.

Preferably the base comprises support means for stabilising the container in use; said support means and base communicating with a drip tray.

The presence of the support means ensures that the container is stable during the dispensation of the beer during the period where the container can not be held by hand.

Preferably the gas outlet means comprises a flow control valve.

As a safety measure the apparatus preferably has means for automatically releasing the pressure in the receptacle if the pressure increases beyond safe limits.

Preferably said receptacle is formed from a tough plastic such as polycarbonate, acrylic, myalar or perspex.

An advantage of the above are their resistance to high energy impacts, their shatterproof nature, their pressure resistance and their transparency.

Said beverage inlet means, gas inlet means and gas outlet means comprise manually operable valves.

Alternatively said beverage inlet means, gas inlet

means and gas outlet means comprise automatically controlled valves.

Said beverage inlet means, gas inlet means and gas outlet means comprise mechanical, pneumatic or electrical valves.

Electrical or pneumatic valves provide more consistent, reliable dispensation of beverages than manual valves which are prone to operator error.

Preferably said beverage inlet means comprises an orifice plate.

The orifice plate improves the formation of bubbles in the beverage as it is dispensed.

Alternatively said beverage inlet means comprises a smooth flow stainless steel dispense tube.

Preferably said orifice plate comprises 4 to 12 holes, each hole being 0.4 to 2.0 millimetres in diameter.

Preferably said orifice plate comprises 4 to 8 holes, each hole being 0.6 to 1.1 millimetres in diameter.

The present invention also provides a method of dispensing a beverage comprising the steps of:

inserting a container in a receptacle; sealing the receptacle; pre-pressurising the receptacle; dispensing the beverage into the container; depressurising the receptacle at a controlled rate; unsealing the receptacle and withdrawing the container.

Alternatively the present invention provides a method of dispensing a beverage comprising the steps of: inserting a container in a receptacle; sealing the receptacle; dispensing the beverage into the container whilst pressurising the receptacle; depressurising the receptacle at a controlled rate; unsealing the receptacle and withdrawing the container.

Preferably the receptacle is pre-pressurised to between 20 and 42 KPa.

Preferably the receptacle reaches a maximum pressure of between 20 and 140 Kpa.

It is desired that the receptacle reaches a maximum pressure of approximately 69 Kpa.

Preferably the receptacle is pressurised using carbon dioxide gas.

Alternatively the receptacle is pressurised using a mixture of nitrogen and carbon dioxide gases or air.

Preferably the beverage is dispensed at a temperature between 2 and 10 degrees Celsius.

It is desired that the beverage is dispensed at a temperature between 3 and 6 degrees Celsius.

It is desired that the beverage is dispensed consistently to within half a degree Celsius.

Preferably the rate of dispensation of the beverage is one pint in 5 to 30 seconds.

It is desired that the rate of dispensation of the beverage is approximately one pint in 15 seconds.

Preferably the receptacle is depressurised in 5 to 30 seconds.

It is desired that the receptacle is depressurised in approximately 10 seconds.

Advantageously the inlet and outlet means of the dispense system are controlled automatically to ensure the correct rates of inflow and outflow of product and gases and the correct volume of beverage dispensed.

The present invention further provides a dispensing apparatus for a beverage comprising a product flow line for conveying the beverage from a storage point to a dispensing station; said flow line comprising one or more product line containing beverage; each product lines being surrounded by a water flow line containing cooled water for maintaining the temperature of the beverage to within half a degree Celsius of a desired temperature; and a water return line for returning said cooled water to the storage point.

Preferably the product flow line is formed from a polymer.

Preferably there is provided a cooling unit in communication with the water flow lines and water return line for providing cooled water to the product flow line.

The present invention will now be described, by way of example only, with reference to the attached drawings

in which:

Figure 1 is a schematic view of a dispense head of the invention.

Figure 2 is a schematic view of the integrated dispense system.

Figure 3 is a schematic view of a part of the integrated dispense system.

Figure 4 is a schematic view of a part of the integrated dispense system.

Figure 5a is a perspective schematic view of a part of the dispense head.

Figure 5b is a perspective schematic view of a part of the dispense head.

Figure 5c is a perspective schematic view of a part of the dispense head.

Figure 5d is a perspective schematic view of a part of the dispense head.

Figure 5e is a perspective schematic view of a part of the dispense head.

As shown in Figure 2 the integrated dispense system 1 comprises a dispense head 2, a remote cooler 3 and a product flow line 4.

As shown in Figure 1, the dispense head 2 comprises a receptacle 10 which receives in use a container 11 into which is dispensed a beverage whilst the dispense head 2 is pressurised. The container 11 may be manufactured from glass or plastic or similar material and may be of variable volume. Typically the container 11 would be a beer glass of either one pint or half pint volume. The beverage is typically a beer. Throughout this description and the appended claims 'beer' should be understood to include lager, ale,

stout or any other brewed beverage. The integrated dispense system can be used for beers having a typical carbonation level of 0.8-2.8 volumes of carbon dioxide. Preferably the beverage is a lager with a high carbonation level of 2.0-2.8 volumes of carbon dioxide.

The receptacle 10 is positioned on a base plate 12. The receptacle 10 is typically of a generally cylindrical form, but may take other forms such as having a square or rectangular cross-section in a plane parallel to the base plate 12. The receptacle 10 may be manufactured from a plastic material, such as a polycarbonate. The material of the receptacle 10 must be able to withstand high pressures. Preferably the receptacle 10 is manufactured from a material that is able to withstand high energy impacts, is shatterproof and from a material that is transparent to allow the user of the system to monitor the dispensation of the beverage. Also a transparent receptacle 10 has the aesthetic advantage that a customer may watch the dispensation of their beverage and the formation of the head on the beverage.

The base plate 12 comprises gas tight seals of a conventional type for forming a sealing contact between the base plate 12 and receptacle 10. The base plate 12 may be permanently fixed to the receptacle 10 or may be removable for facilitating the cleaning of the base plate 12 and removal and insertion of the container 11 in the receptacle 10. Preferably the base plate 12 comprises a support means for locating the container 11 in the correct orientation for dispensation of the beverage. This support means may be in the form of a recessed portion 25 of the base

plate in which the container 11 rests, or in the form of a raised annular ring in which the base of the container 11 is inserted. Preferably the recessed portion 25 contains different depths of recesses for receiving both half and one pint glasses. The support means also performs the function of supporting the container 11 during dispensation of the beverage since the beverage is not able to be supported by hand during dispensation.

Preferably the base plate 12 incorporates a drip tray 13 for collecting any liquid that is spilt during dispensation or removal of the full container 11. The drip tray 13 incorporates a tap 26 for emptying the drip tray 13.

A dispense manifold 14 is positioned on the top of the receptacle 10. The manifold 14 comprises sealing means of a conventional type for forming a gas-tight seal with the receptacle 10. Alternatively the manifold 14 may be permanently fixed to the receptacle 10, for example, by adhesive. The manifold 14 also comprises a beverage inlet 15, a gas inlet 16 and a gas outlet 17 all in fluid communication with the receptacle 10. The gas outlet 17 terminates in a gas bleed hole 23. Preferably the gas bleed hole 23 incorporates a flow control means such as a valve for releasing automatically the pressurised gas within the receptacle. In the event of the receptacle 10 becoming over-pressurised excess pressure will be vented by means of a pressure control valve 50.

It should be noted that the features of the integrated dispense system dispense head allow the incorporation of a receptacle 10 of any size. The receptacle is not

restricted to a size suitable for pint glasses.

In a first embodiment of the present invention, as shown in Figure 1, the receptacle 10 comprises a gas-tight cabinet comprising a door 27 in one side through which a container 11 may be inserted. The door comprises hinges 18, a handle 28 and sealing means to allow the door to be closed and sealed and the receptacle 10 to be pressurised.

In a second embodiment of the present invention as shown in Figure 5a and 5b the receptacle 10 comprises a hinged split cylinder which opens along the long axis of the cylinder to receive a container 11 laterally. The cylinder 11 may be split into two halves as shown in Figure 5a, hinged along one seam or, as shown in Figure 5b, may be split into one half and two quarter segments, hinged along two seams. The hinges 18 of the receptacle 10 must be gas-tight and there is provided sealing means of a conventional type on the split cylinder to seal the external edges upon closing of the receptacle 10. The second embodiment may be adapted as shown in Figures 5c and 5d to be hinged at the top of the receptacle 10 so that the front segment of the cylinder swings open in a vertical plane allowing the container 11 to be removed easily.

In a third embodiment of the present invention a container 11 is placed on the base plate 12, preferably in a support means, and the receptacle 10, in this embodiment a removable cylindrical tube, is positioned on the base plate 12 surrounding the container 11. The dispense manifold 14 is then placed on top of the receptacle and secured by securing

means. The securing means may be in the form of a clamp, threaded connection or other similar engagement-disengagement mechanism. Alternatively the manifold 14 and cylindrical tube can be fixed together to move as one piece. The third embodiment may be adapted, as shown in Figure 5e, by mounting the base plate 12 and drip tray 13 on a movable platform that rises to engage the receptacle 10 when an empty glass is placed in the support means. When the dispensation of the beverage is complete the base plate 12 is lowered to allow the glass to be removed. Preferably the receptacle is fixed. Preferably the base plate 12 is raised and lowered automatically, for example, by hydraulics.

The beverage inlet 15 may comprise a conventional dispensing tap or smooth flow stainless steel dispense tap as used for dispensing keg beers and preferably incorporates an orifice plate for improved dispensing characteristics. The orifice plate typically has 4 to 12 holes, each hole being 0.4 to 2 millimetres in diameter. Preferably the orifice plate has 4 to 8 holes with each hole having a diameter of 0.6 to 1.1 millimetres.

The beverage inlet 15, gas inlet 16 and gas outlet 17 may comprise valves which may be manually operated or operated automatically by a control unit 22. The inlets 15, 16 and outlet 17 may be electrical, mechanical or pneumatic valves or solenoids 19, 20, 21. The gas in the pneumatic solenoids may be compressed air or the same gas as used to pressurise the receptacle 10. The control unit 22 which may be incorporated in the dispense head 2 or connected thereto controls the solenoids 19, 20, 21 to open and

close the inlets 15, 16 and outlet 17. Preferably the control unit 22 comprises an erasable programmable read-only memory (EPROM) module for storing instruction codes for controlling the integrated dispense system. Therefore the control unit 22 may be easily reprogrammed from time to time in order to be readily usable with new lines of beverage as they become available. An advantage of the electronic control unit 22 is that the rate of beverage dispensing and the rate of gas influx and gas release can be precisely controlled and can be performed repeatedly with consistency.

Preferably the manifold 14 comprises a pressure gauge for monitoring the pressure of the receptacle. The gauge may be a dial gauge visible to the user or an electronic gauge monitored by the control unit 22.

The control unit 22 is linked to a user interface comprising operating buttons and programming means for programming the EPROM module in the control unit 22. Preferably the user interface comprises means for selecting the volume of beverage to be dispensed and type of beverage to be dispensed (if more than one product flow line is connected to the dispense head).

It is envisaged that the integrated dispense system may include fonts with multiple dispensing points. These dispensing points may be in a conventional T-bar font, in a rotating mechanism, using a multiple dispense chamber or a series of chambers connected to the manifold 14.

The beverage inlet solenoid 21 is connected to an in-line flow meter 24 which monitors the volume of

beverage dispensed allowing measures to be accurately dispensed. The flow meter 24 is connected to the product flow line 4. As shown in Figure 4 the product flow line 4 comprises one or more product lines 31 each of which is surrounded by a water flow line 32 that forms a jacket enclosing the product line 31. The water flow line 32 contains cooling water that maintains the temperature of the beverage as the beverage transits the product flow line 4 between the remote cooler 3 and the dispense head 2. The product flow line 4 also comprises a water return line 33 for returning the water passing through the water flow lines 32 to the remote cooler 3 where it is again cooled and passed along the water flow lines 32. Therefore the water cooling system comprises a closed circuit which has the advantage that wastage of water and energy is reduced. The water return line 33 and the water flow lines 32 are surrounded by the product flow line core 34. The core 34 provides the structural integrity to the product flow line 4 and preferably acts to insulate the water return line 33 from the product flow lines 31. The core 34 may be manufactured from polyurethane, polypropylene or other suitable material that possesses reasonable flexibility and durability. Alternatively the water return line 33 may be positioned external to the product flow line core 34 and running alongside the product flow line 4.

The product flow line 4 is connected to the remote cooler 3 which comprises a pump 40 and a cooling unit 41. As shown in Figure 3 the pump 40 receives the beverage from a store via an inlet 42 and outputs the beverage via an outlet 43. The temperature of the beverage is lowered by the cooler 3, and temperature control means incorporated in the cooler 3 allows the

temperature of the beverage to be specified preferably to within half a degree Celsius.

Typically the beverage is dispensed in the temperature range 2 to 10 degrees Celsius. Preferably the beverage is dispensed at approximately 3-6 degrees Celsius. Preferably the integrated dispense system is set up to dispense the beverage at a temperature within the range described above and to maintain the beverage within half a degree Celsius of that temperature. For example if the system was set up to dispense a beverage at 6 degrees Celsius the system would preferably maintain the beverage between 5.5 and 6.5 degrees Celsius.

The outlet 43 may feed into more than one product flow line 4, in which case isolation switches 44 are incorporated in the product flow lines 4 in order to select the line 4 to feed. Preferably the output feeds into 2 to 6 separate flow lines 4, each of which may have its own pressure and flow rate. The isolation switches 44 may be controlled manually or may be controlled automatically by the control unit 22 or by a control unit dedicated to the remote cooler 3. The storage of the beverage may be in conventional kegs or other pressurised containers.

The operation of the integrated dispense system will now be described for an embodiment of the invention where the receptacle 10 comprises a hinged split cylinder which opens along the long axis of the cylinder to receive a container 11 laterally and assuming the dispense head 2 is initially empty.

The receptacle 10 is opened and the container 11 is

positioned on the base plate 12 in the support means. The receptacle is closed and sealed. Thus the receptacle 10 forms a gas-tight pressurisable space. The gas inlet solenoid 19 is operated and the receptacle is pre-pressurised. The gas used to pre-pressurise the receptacle is preferably carbon dioxide but other inert gases such as nitrogen or a mixture of carbon dioxide and nitrogen or air may also be used. The pressure to which the receptacle is pre-pressurised will depend on the beverage being dispensed. Preferably the pre-pressure will be approximately 2-6 psi (20-42 KPa). Alternatively the receptacle 10 may not be pre-pressurised at all but simply sealed. Once the desired pre-pressure has been reached the beverage inlet solenoid 21 is operated and the in-line flow meter 24 dispenses the beverage into the container 11. The dispensing of the beverage into the receptacle 10 causes the pressure in the receptacle 10 to rise. Preferably the maximum pressure reached in the receptacle 10 during dispensation is between 20 and 140 Kpa. The receptacle 10 can be designed to allow no gas escape from the receptacle 10 during dispensation, resulting in a relatively large increase in pressure, or can be designed to allow a controlled release in pressure via the gas bleed 23 and solenoid 20, resulting in a relatively small pressure increase in the receptacle during dispensation.

Alternatively the receptacle 10 may not be pre-pressurised but sealed. The inlet solenoid 21 is operated to dispense the beer and the gas inlet solenoid 19 is operated whilst the beer is dispensed in order to pressurise the receptacle 10. Once the dispensation has finished the dispense head 2 is de-

pressurised as described above.

The combination of pre-pressure level, maximum pressure level and pressurising gas allows a great variety of end results to be achieved, making the present invention suitable for a wide variety of drinks.

The beverage is typically dispensed at the rate of one pint in 5 to 30 seconds. Preferably one pint is dispensed in approximately 15 seconds. The beverage is dispensed at a pressure slightly above the pressure of the receptacle. This pressure prevents backflow of air into the beverage inlet 15 and product flow line 4. Only a small portion of the dissolved carbon dioxide in the beverage comes out of solution upon dispensing due to the relatively high pressure of the receptacle 10. The saturation level of the carbon dioxide is raised by the increased pressure thereby reducing the amount of carbon dioxide that is spontaneously released from the beverage upon dispensation. The carbon dioxide that does come out of solution upon dispensing serves to form bubbles throughout the beverage which rise to form a slight head on the beverage. The formation of this head may be assisted by the orifice plate in the beverage inlet which sets up swirling flow patterns in the beverage that enhance the formation of the head. Alternatively a smooth flow tube could be used. After the dispensation is completed the gas outlet solenoid is operated and the pressurised gas is gradually released through the gas bleed hole 23 until the receptacle is at atmospheric pressure. The rate of gas release is critical to the formation of a suitable head on the beverage. If the pressure is released too quickly the beverage will

over-foam (fobs) rapidly leading to a loss of product. If the release is too slow undue waiting time results which would be disadvantageous in a busy bar. The time required to depressurise the receptacle 10 is typically 5-30 seconds. Preferably the time required to depressurise the receptacle 10 is approximately 10 seconds. During the depressurisation the bubbles in the beverage head expand, thus the head of the beverage increases in depth. The presence of the head on the beverage prevents the majority of the rest of the dissolved carbon dioxide in the beverage from coming out of solution enabling for example a beverage with an initial carbonation of 2.2 volumes to produce a drinkable beverage with a carbonation level of approximately 2.0 volumes. The receptacle is then opened and the container removed. The dispense head 2 is then ready to dispense another beverage.

It has been found that the head on a beverage dispensed in the manner described above will last for up to thirty minutes whilst retaining the desired close-knit creamy texture.

The integrated dispense system may incorporate a customer interface unit comprising electronically generated visual images and sounds. The customer interface unit may incorporate conventional bar-mounted fonts. Preferably the images and sounds would be linked to the progress of the dispensation of the beverage and would serve to entertain and inform the customer waiting for their beverage. Preferably the interface unit would comprise illuminations. Preferably the sounds would include voice messages and musical tunes. Preferably the visual images would include animations and moving images. Preferably the

customer interface unit signals the completion of the dispensation of the beverage with an audible tone and/or visual cue.

Whilst the present invention has been described in use for dispensing beer it should be understood that the present invention is not limited to the dispensation of beer and may be successfully used for dispensing other beverages.

CLAIMS

1. A dispensing apparatus for a beverage comprising a receptacle; said receptacle comprising a base and a manifold coupled thereto; said manifold including beverage inlet means, gas inlet means and gas outlet means; said receptacle further comprising aperture means for receiving therethrough in use a container; sealing means being provided on said receptacle for rendering the receptacle pressurisable.

2. A dispensing apparatus for a beverage as claimed in claim 1 wherein the aperture means comprises a door in said receptacle.

3. A dispensing apparatus for a beverage as claimed in claim 1 wherein the manifold is removable from the receptacle; said aperture means comprising an opening between the receptacle and the manifold so formed.

4. A dispensing apparatus for a beverage as claimed in claim 1 wherein the base is removable from the receptacle; said aperture means comprising an opening between the receptacle and the base so formed.

5. A dispensing apparatus for a beverage as claimed in claim 1 wherein the receptacle comprises engagable segments, hinged to open along a long axis of the receptacle; said aperture means comprising an opening between the engagable segments so formed.

6. A dispensing apparatus for a beverage as claimed in any preceding claim wherein the base comprises support means for stabilising the container in use; said support means and base communicating with a drip

tray.

7. A dispensing apparatus for a beverage as claimed in any preceding claim wherein the gas outlet means comprises a flow control valve.

8. A dispensing apparatus for a beverage as claimed in any preceding claim wherein said receptacle is formed from a tough plastic such as polycarbonate, acrylic, myalar or perspex.

9. A dispensing apparatus for a beverage as claimed in any preceding claim wherein said beverage inlet means, gas inlet means and gas outlet means comprise manually operable valves.

10. A dispensing apparatus for a beverage as claimed in any of claims 1 to 9 wherein said beverage inlet means, gas inlet means and gas outlet means comprise automatically controlled valves.

11. A dispensing apparatus for a beverage as claimed in any of claims 9 or 10 wherein said beverage inlet means, gas inlet means and gas outlet means comprise mechanical, pneumatic or electrical valves.

12. A dispensing apparatus for a beverage as claimed in any preceding claims wherein said beverage inlet means comprises an orifice plate.

13. A dispensing apparatus for a beverage as claimed in any preceding claims wherein said beverage inlet means comprises a smooth flow stainless steel dispense tube.

14. A dispensing apparatus for a beverage as claimed in claim 12 wherein said orifice plate comprises 4 to 12 holes, each hole being 0.4 - 2 millimetres in diameter.

15. A dispensing apparatus for a beverage as claimed in claim 12 or claim 14 wherein said orifice plate comprises 4 to 8 holes, each hole being 0.6 - 1.1 millimetres in diameter.

16. A method of dispensing a beverage comprising the steps of:

inserting a container in a receptacle; sealing the receptacle; pre-pressurising the receptacle; dispensing the beverage into the container; depressurising the receptacle at a controlled rate; unsealing the receptacle and withdrawing the container.

17. A method of dispensing a beverage comprising the steps of:

inserting a container in a receptacle; sealing the receptacle; dispensing the beverage into the container whilst pressurising the receptacle; depressurising the receptacle at a controlled rate; unsealing the receptacle and withdrawing the container.

18. A method of dispensing a beverage as claimed in claims 16 or 17 wherein the receptacle is pre-pressurised to between 20 and 42 KPa.

19. A method of dispensing a beverage as claimed in claims 16 to 18 wherein the receptacle reaches a maximum pressure of between 20 and 140 KPa.

20. A method of dispensing a beverage as claimed in claims 16 to 19 wherein the receptacle reaches a maximum pressure of approximately 69 Kpa.

21. A method of dispensing a beverage as claimed in any of claims 16 to 20 wherein the receptacle is pressurised using carbon dioxide gas.

22. A method of dispensing a beverage as claimed in any of claims 16 to 20 wherein the receptacle is pressurised using a mixture of nitrogen and carbon dioxide gases or air.

23. A method of dispensing a beverage as claimed in any one of claims 16 to 22 wherein the beverage is dispensed at a temperature between 2 and 10 degrees Celsius.

24. A method of dispensing a beverage as claimed in any one of claims 16 to 23 wherein the beverage is dispensed at a temperature between 3 and 6 degrees Celsius.

25. A method of dispensing a beverage as claimed in claim 23 or claim 24 wherein the beverage is dispensed consistently to within half a degree Celsius.

26. A method of dispensing a beverage as claimed in any of claims 16 to 25 wherein the rate of dispensation of the beverage is one pint in 5 to 30 seconds.

27. A method of dispensing a beverage as claimed in any of claims 16 to 26 wherein the rate of dispensation of the beverage is approximately one pint

in 15 seconds.

28. A method of dispensing a beverage as claimed in any of claims 16 to 27 wherein the receptacle is depressurised in 5 to 30 seconds.

29. A method of dispensing a beverage as claimed in any of claims 16 to 28 wherein the receptacle is depressurised in approximately 10 seconds.

30. A dispensing apparatus for a beverage comprising a product flow line for conveying the beverage from a storage point to a dispensing station; said flow line comprising one or more product lines containing beverage; each product line being surrounded by a water flow line containing cooled water for maintaining the temperature of the beverage to within half a degree Celsius of a desired temperature; and a water return line for returning said cooled water to the storage point.

31. A dispensing apparatus as claimed in claim 30 wherein the product flow line is formed from a polymer.

32. A dispensing apparatus as claimed in claims 30 or 31 wherein there is provided a cooling unit in communication with the water flow lines and water return line for providing cooled water to the product flow line.

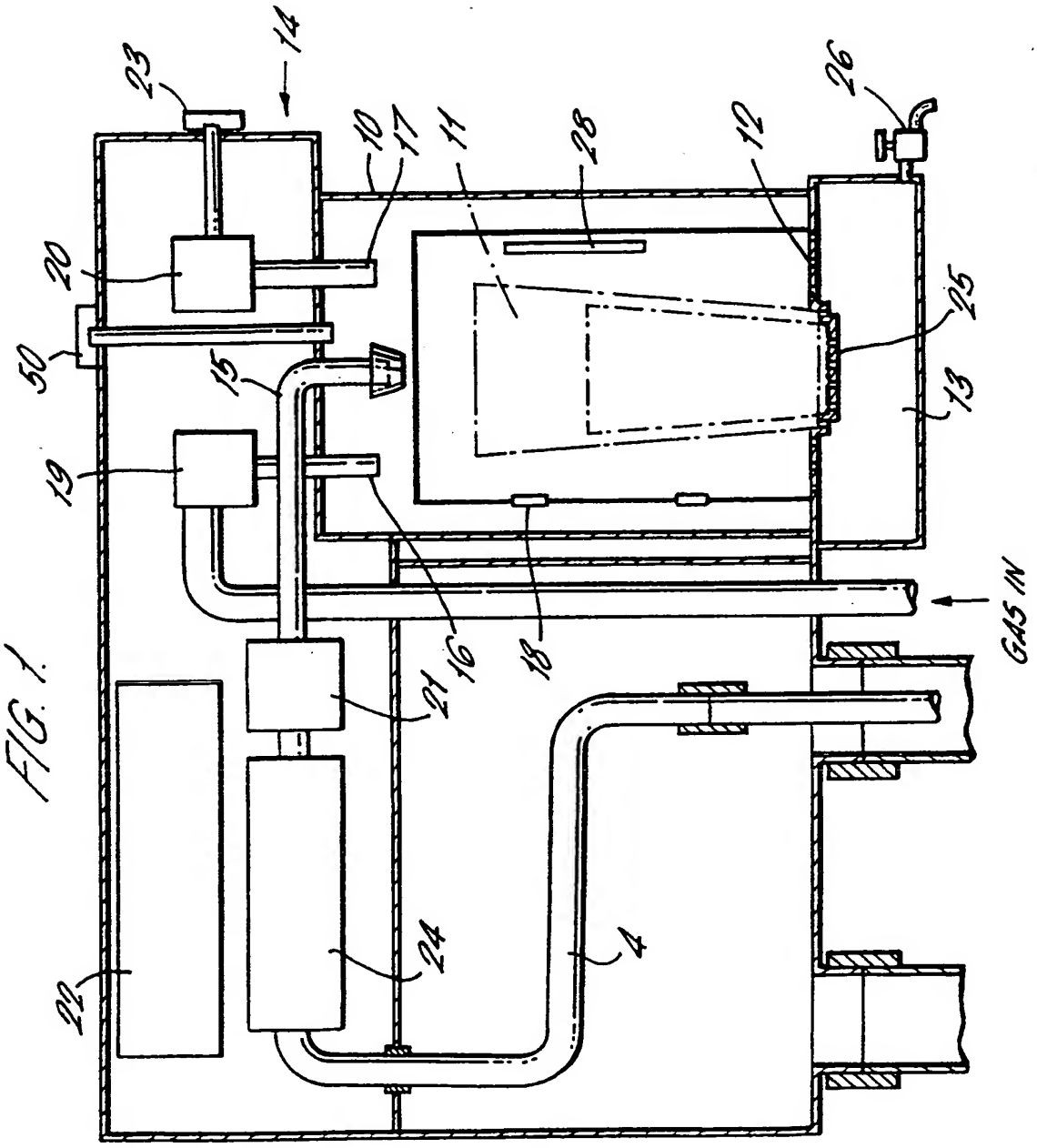


FIG. 1.

FIG. 2.

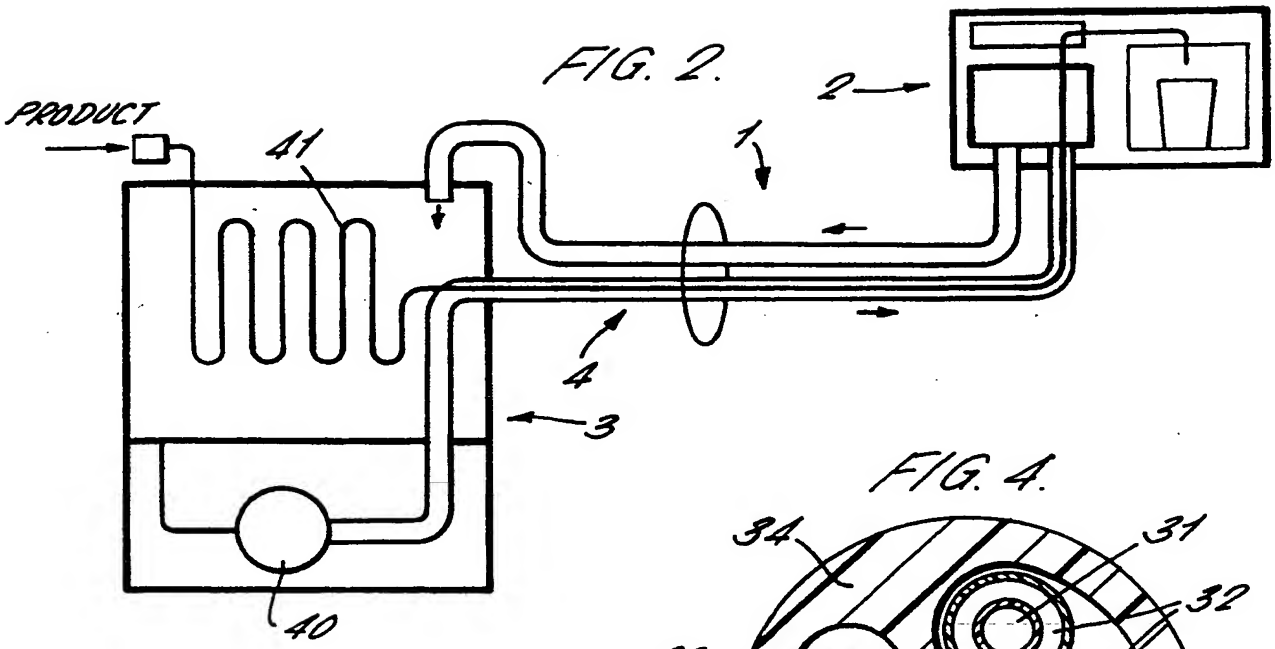


FIG. 4.

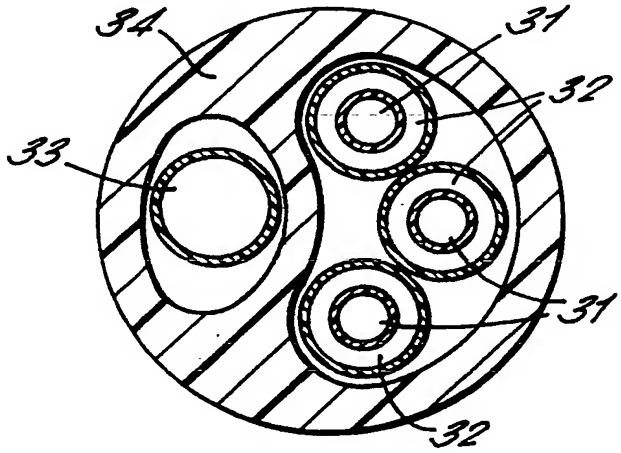


FIG. 3.

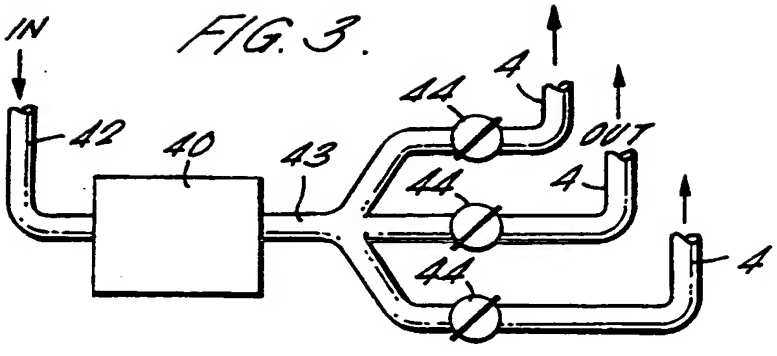


FIG. 5a.

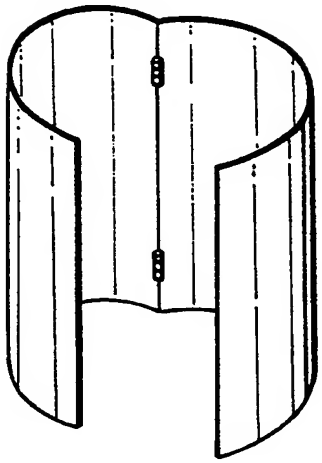


FIG. 5b.

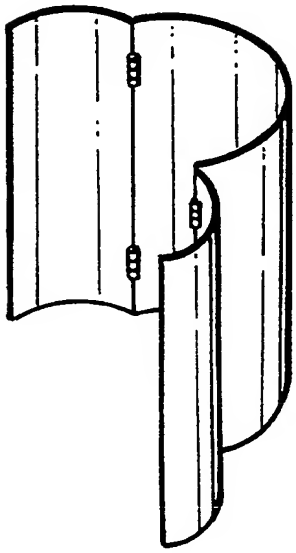


FIG. 5c.

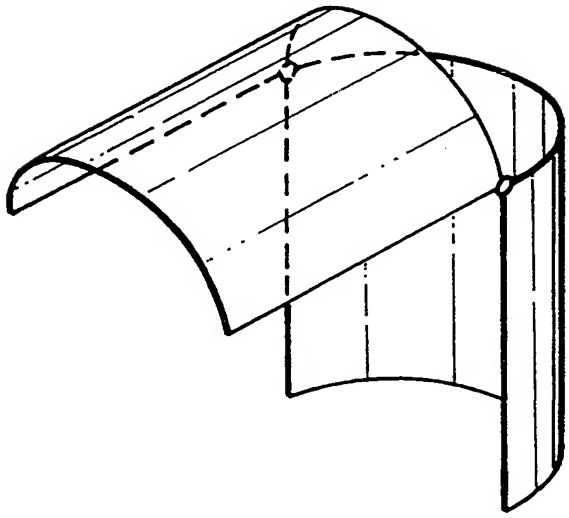
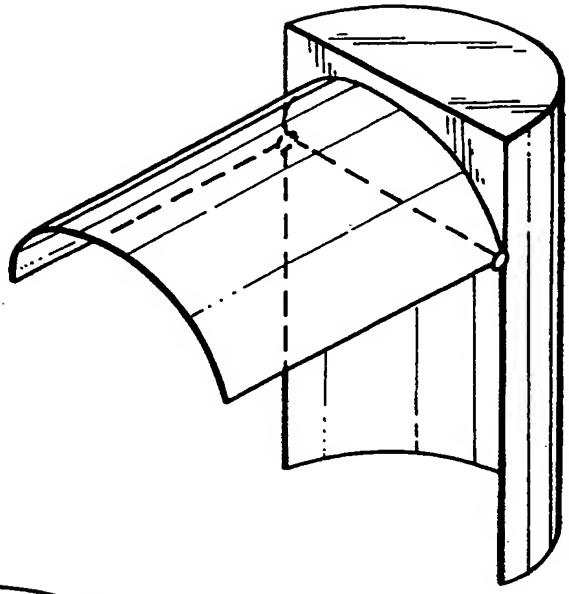


FIG. 5d.



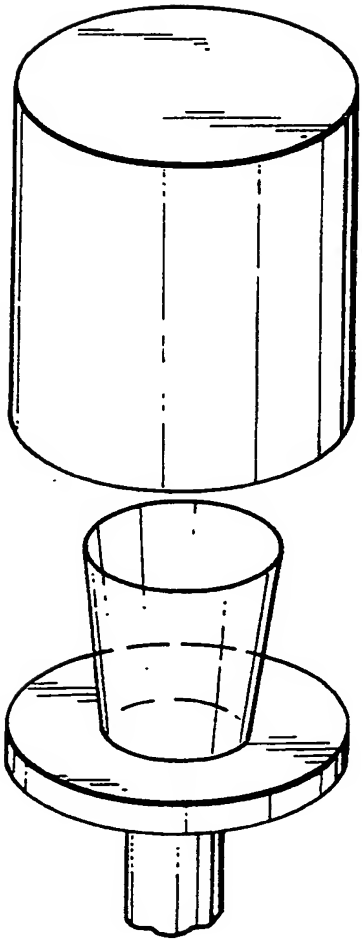


FIG. 5e.